U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Risk Management Committee Meeting
PWROG Meeting: April 19, 2023

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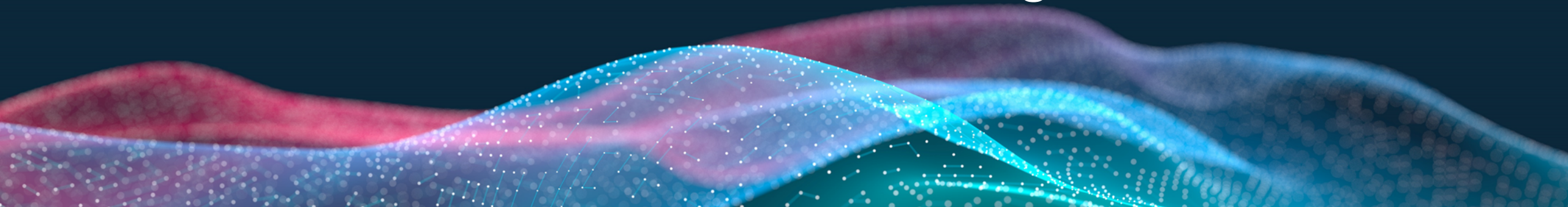


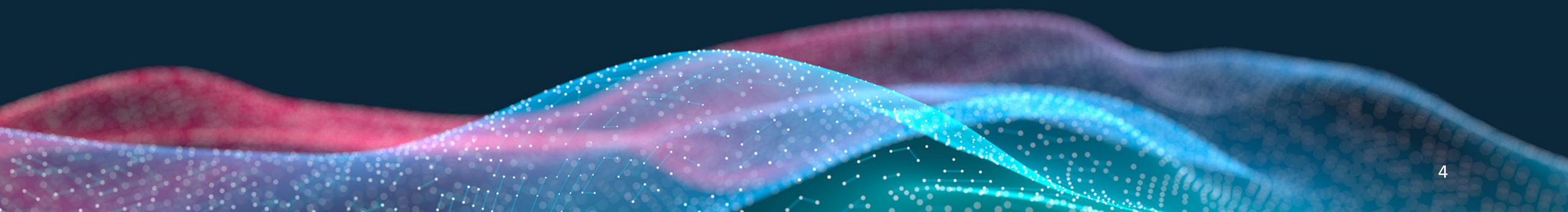
Agenda

- Introduction
- PRA Configuration Control Update
- Risk Assessment Process for Topical Reports (RAPTR)
- Risk-Informed Material Assessment
- Risk-Informing Digital Instrumentation and Control
- Seismic Re-Evaluation Under POANHI
- Guidance/Infrastructure Updates

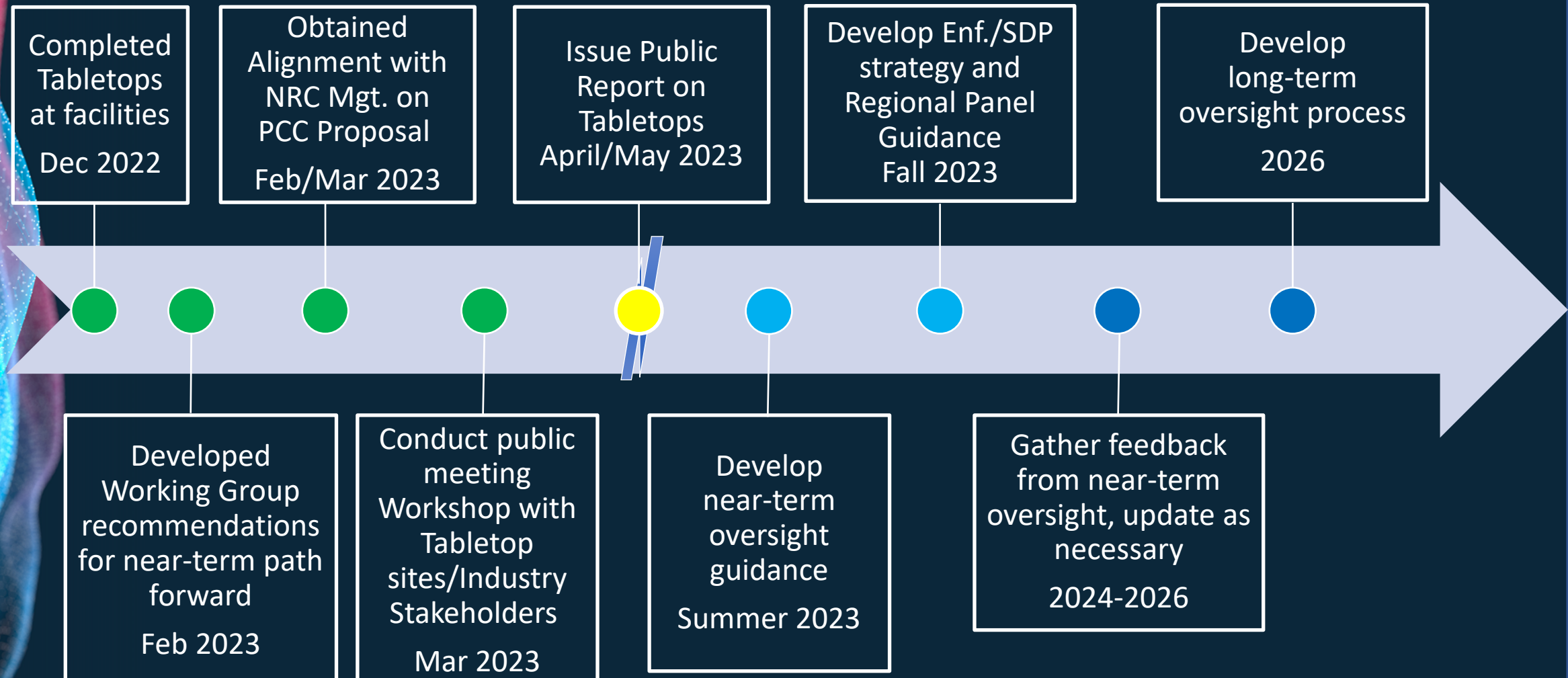
Key Topics of Interest

- Sustaining RIDM expectations within NRR
  - SPAR-DASH – realism in SPAR models
  - LIC-206
- High-burnup fuel and increased enrichment rulemaking activities (source-term, dose consequences)
- HEAF-related activities
- Prioritization of new risk initiatives
  - Be riskSMART approach (e.g., Ultimate Heat Sink)
  - Awareness of interrelated issues and new opportunities
- NRC Risk Forum approach – September 2023

PRA Configuration Control Update



Overall Plan & Path Forward



Feedback from Outreach Efforts

- We are listening to your feedback and we recognize the unique challenges of this oversight framework.
- OpESS+ provides maximum flexibility for regions and the cross regional panel process will ensure consistent application.
- The PCC WG is currently working on determining the correct application of inspections and the guidance associated with implementing the OpESS+.
- The OpESS+ is intended to be resource neutral and is part of the overall graded and balanced approach that will eventually determine the long-term recommendations for PCC, which is targeted for implementation in the 2027 ROP inspection cycle.

What is OpESS?

- OpE (Operating Experience) and SS (Smart Sample) = OpESS
- The OpESS is designed as an additional tool to be used by agency staff in ROP baseline inspection preparation. The information and trends identified from OpESS inspections may provide further indication that a specific issue warrants additional agency action.
- Each OpESS has a unique and sequential identifier.

  https://www.nrc.gov/reactors/operating/ops-experience/operating-experience-smart-sample.html

WG's Recommended Inspection Enhancement

- **Step 1 (Near-term): <u>OpE Smart Sample (OpESS+)</u>**

- OpESS+ allows for more enhanced application of the smart sample approach

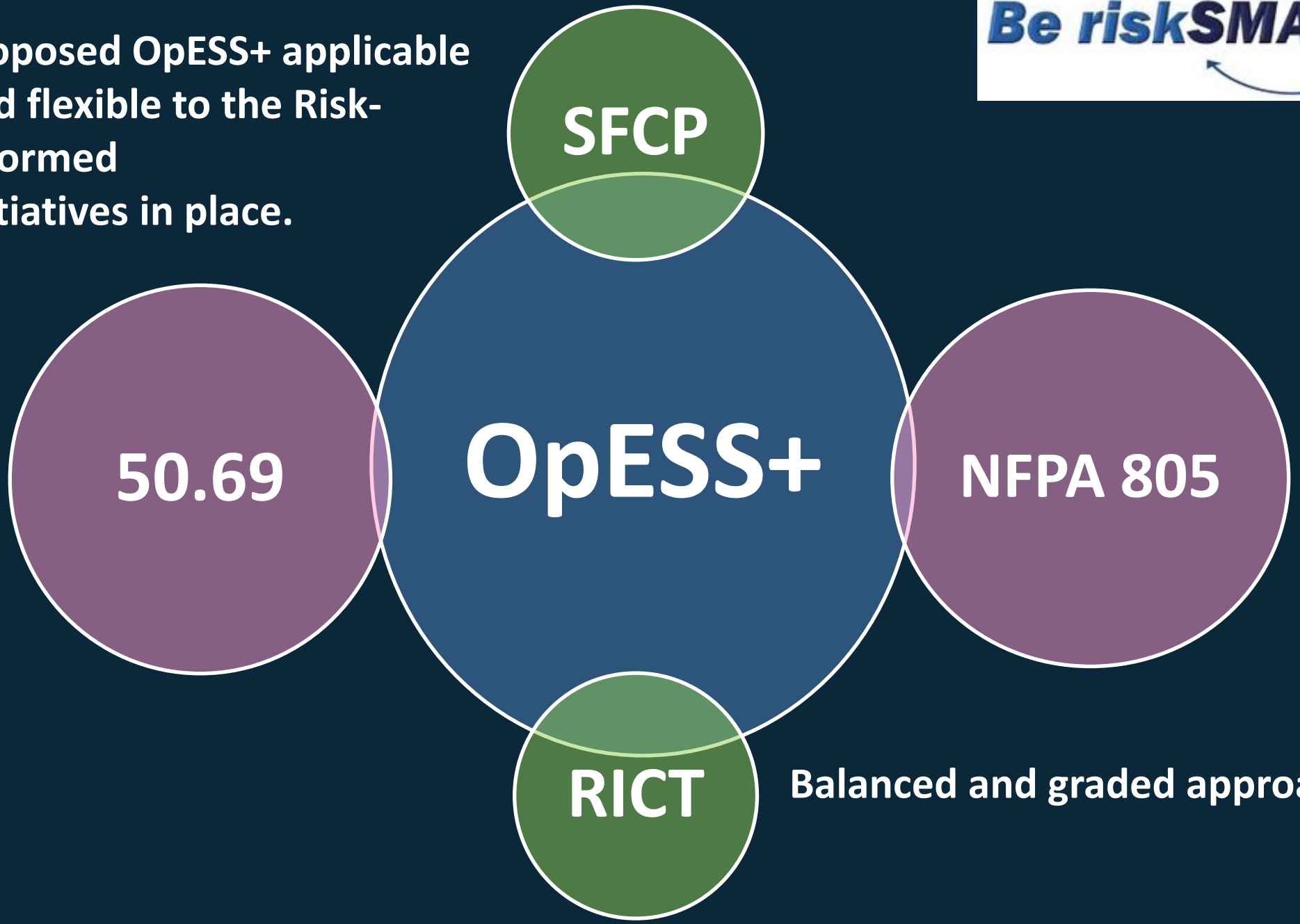
<u>PROPOSED</u> Inspection Procedures:

- **71111.21M**, Comprehensive Engineering Team Inspection, (CETI)
- **71111.21N.05**, Fire Protection Team Inspection (FTPI)
- **37060**, 10 CFR 50.69 Risk–Informed Categorization and Treatment SSC
- *Resident Baseline: 71111 as appropriate (TBD)*
- *Focused Engineering Inspection (FEI) – None Current, Future TBD (2024-2026)*

- **Step 1.A: Evolve/Update OpESS+ as needed.**

Be riskSMART

Proposed OpESS+ applicable and flexible to the Risk-Informed
Initiatives in place.



Balanced and graded approach.

Near-term Actions – OpESS+

- Obtain and address Industry and Public Feedback
  - Conducted public workshop on March 30, 2023
  - Bi-Monthly ROP Meeting on April 5, 2023
- Internal Communication/Awareness
- Training and Communication with Inspectors
- Finalize OpESS+ guidance
- Enforcement / Significance Determination Process
  - Initiate Cross Regional Panel Process
  - Develop Screening Guidance
  - More-than-Minor/Green Threshold criteria

Long-term Actions - ROP Update

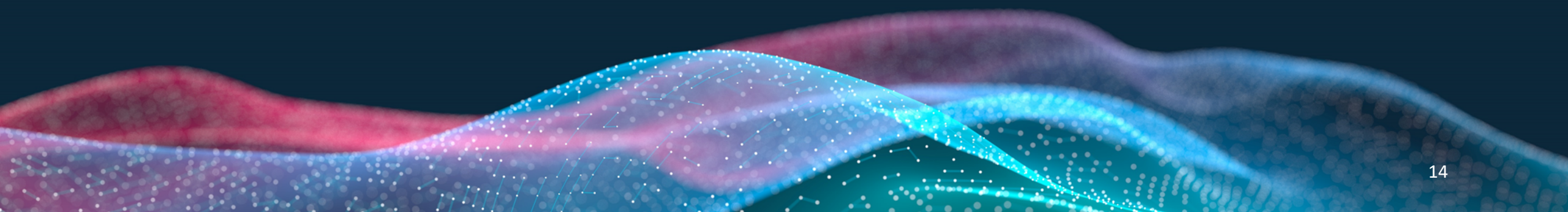
- Based upon Feedback from OpESS+, institutionalize changes to ROP (Target 2026-2027)
  - Data and information gained from OpESS will inform future oversight in this area (level-of-effort, sample size, inspection sample selection, staff training)
- Update SDP/Enforcement of PCC issues
  - How do you determine more-than-minor?
  - How do you determine significance?
- What frequency to perform inspection?

Future Planned Outreach Efforts

- Issue publicly available report on insights from Tabletops
  - Background, site selection criteria, information request, inspection areas (Design, Operations, Maintenance, Engineering), key observations
- Continue to engage with public and industry
  - ROP Bi-Monthly public meetings
  - Public workshops
  - Industry meetings/interactions

Questions/Feedback on PRA CC?

Risk Assessment Process for Topical Reports (RAPTR)



Risk Informing Topical Report Reviews

- Current TR review process is described in LIC-500, Rev. 9, "Topical Report Process," Jan 2022 (ADAMS Accession No. ML20247G279).
- Consistent with LIC-500 Rev 9, a sponsor can propose one of four review pathways:
  - Standard – Highly complex new or revised TR - 2 years
  - Compressed – Less complicated TR, minimal RAIs - 1 year
  - Uncomplicated – Minor revision TR, no RAIs - 6-12 months
  - SE Confirmation – Revision which doesn't revise existing SE (vendor change) - 3-6 month

Risk Informing Topical Report Reviews (Cont.)

- On February 16, 2023, the PWROG submitted via letter PWROG-22010-NP “Risk Assessment Process for Review of Topical Reports (RAPTR)” (ADAMS Accession Nos. ML23047A200 and ML23047A202).
- The purpose of the PWROG's submittal is to provide potential guidance to generically determine the safety significance of future topical reports and to assign appropriate resources commensurate with that significance.
- A fee waiver was submitted and is currently under review by OCFO.

Risk Informing Topical Report Reviews (Cont.)

- An NRC Working Group has been established to determine viability of RAPTR.
- One option being considered by the WG is a potential to leverage and/or enhance the recently updated LIC-500.
- Working group recommendations with alignment from management will determine path forward and any future interactions with the public and the PWROG.

Risk Informing Topical Report Reviews (Cont.)

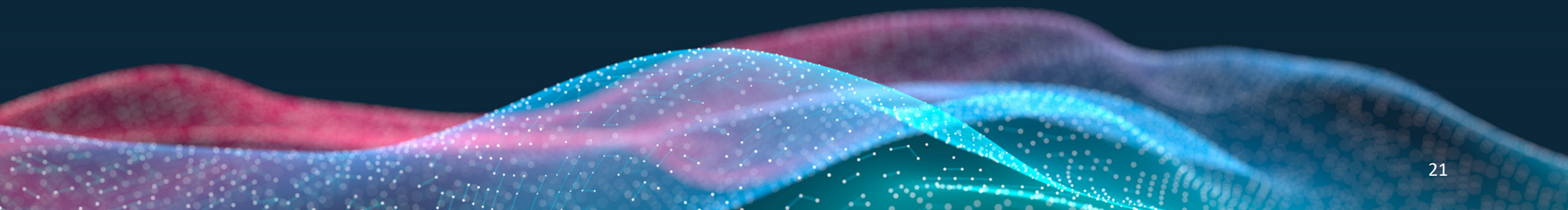
- Areas for discussion include:
  - PWROG-22010-NP proposes a graded risk evaluation approach
    - Would the length and level of NRC review be the same regardless of the type of risk evaluation (simple vs complex) used to support the TR?
    - For TRs supported by a complex risk assessment, how would PRA acceptability be demonstrated?
      - Would F&Os be included as part of the submittal?
  - The proposed process does not discuss use of the qualitative screening questions that are part of RIPE. How will the process confirm that risk is an appropriate metric for ensuring low safety significance of the issue?
  - For which types of issues do you anticipate using RAPTR?
  - Any specific examples where RAPTR would be considered?

Potential Benefits of Risk-Informing Topical Report Reviews

- Focus NRC and licensee resources on the most safety significant issues
- Address low safety significance issues in an efficient and predictable manner consistent with NRC's Principles of Good Regulation
- Leverage existing regulations and risk insights
- Incentivize the further development and use of probabilistic risk assessment models and applications

Questions/Feedback on RAPTR?

Risk-Informing Materials/Passive System Related Issues



Some key accomplishments

- Over the last 20+ years, NRC has approved industry's requests for alternative inspection programs for passive components that leverage risk insights as part of their technical basis. Examples include :
  - Elimination of circumferential weld inspections in BWR pressure vessels (BWRVIP-05, EPRl TR-105697 and GL 98-01),
  - Extension of the inspection interval for PWR pressure vessel welds from 10 years to a maximum of 20 years (WCAP-16168-A, ML11306A084)
  - Revised Risk-Informed Inservice Inspection Evaluation Procedure (EPRI TR-112657 Rev. B-A, ML0134700102)

Some key technical issues

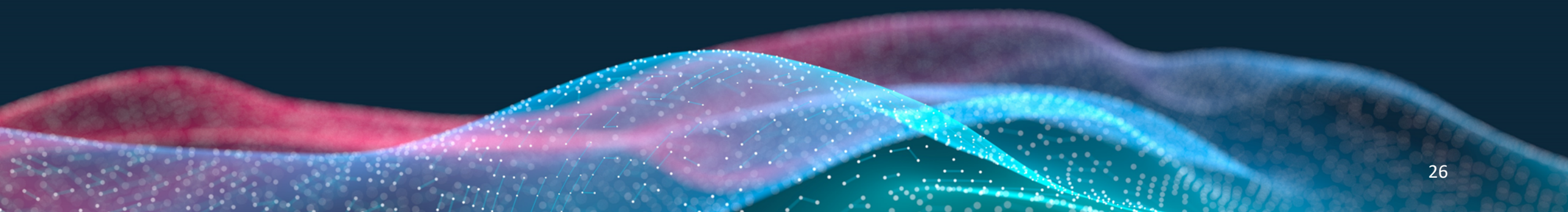
- Consideration of performance monitoring is an essential component in staff reviews relating to material related issues.
- While plant safety is the main consideration when staff reviews licensee requests to relax existing requirements, enterprise risk is also considered.
- PRA results (minimal cut sets) constitute a valuable, and yet an incomplete input to defense-in-depth determinations.
- Staff positions established in reviewing RI-ISI are a relevant, however, likely insufficient basis to justify 10 CFR 50.69 related changes.

Some actions towards enhancing staff/industry alignment

- Sharing insights/lessons learned from decisions relating to ongoing licensing actions and the associated EPRI and OG reports.
- Public meetings (e.g., planned public meeting on April 27, 2023 (ML23083B972)).

Questions/Feedback on RI Materials?

Risk-Informing Digital Instrumentation and Control (DI&C)



Status of SECY on Risk-Informing DI&C Common Cause Failure Evaluation

- SECY-22-0076 “Expansion of Current Policy on Potential Common-Cause Failures in Digital Instrumentation and Control Systems” (with supplement, ML22357A037)
  - Alternative to SECY 93-87
  - Currently with Commission for review
  - Staff preparing to develop technical guidance

https://www.nrc.gov/docs/ML2219/ML22193A290.html

Anticipatory Planning for Digital I&C Data Needs

<u>Licensing</u>

Implementation of SECY

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Bounding Value for DI&C CCF for PRA-supported D3 assessment

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Near-term

<u>Post-Licensing</u>

PRA Update to Reflect As-Built and As-Operated Plant

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Non-bounding Values for DI&C Failure Probabilities

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Long-term

Objective

- Establish a focused effort for high quality digital I&C hardware and software failure data
  - Support implementation of SECY for Licensing DI&C systems: Bounding approach for D3 analysis
  - PRA Maintenance: Post-approval to reflect as-built, as-operated plant

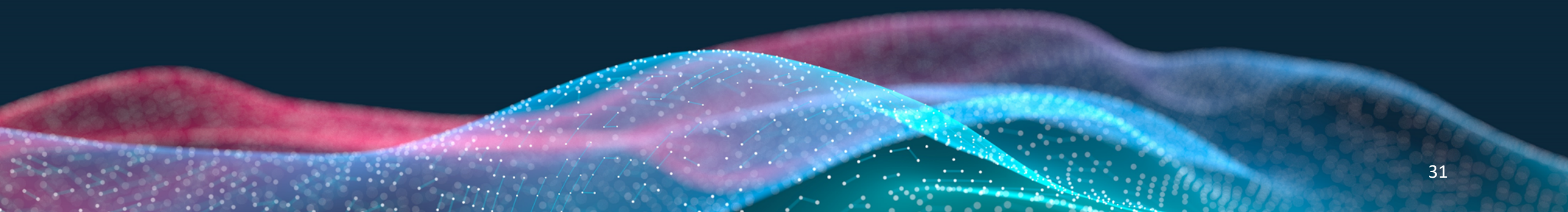
Strategy and Actions

Timeframe	Desired State (for PRA Configuration of LARs)	Action

Pending Commission approval of SECY-22-0076	- DI&C failure probabilities considered sources of uncertainty
	- Sensitivities to determine impact (key uncertainty or not);
	  - Bounding value used for licensing can support sensitivities
	- Risk management actions if identified as key uncertainty
		- Collect and analyze DI&C hardware and software failure data, including CCF
		  - Initiated collection and analysis of INPO data through the Operational Experience (OpE) program of the Office of Nuclear Regulatory Research (RES)
		  - Clarity and quality of reporting of data is important

Near term: (depending on quality of data)	- **Use failure data (+ expert elicitation) to identify and align on Order of Magnitude failure probability estimates** - Consensus approach; not a key uncertainty	**Continue DI&C hardware and software failure data collection**
Long term: (depending on quality of data)	- **Use failure data to determine and align on realistic failure probabilities** - Consensus approach; not a key uncertainty	**DI&C hardware and software failure data collection is routine activity like non-DI&C data**

Seismic Re-Evaluation Under Process for Ongoing Assessment of Natural Hazard Information (POANHI)

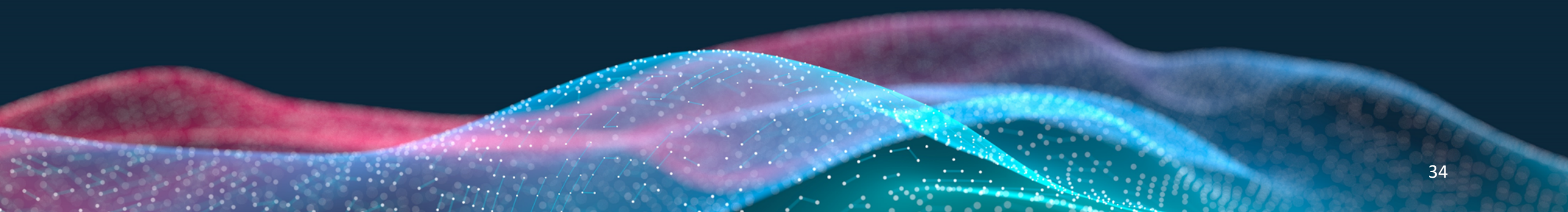


Status

- Hazard and risk significance re-evaluation complete or underway for multiple plants
  - Risk significance screening uses thresholds identified in November 2022 public meeting
  - Any plant modifications due to post-Fukushima seismic PRA results are being considered
  - If necessary, licensee will be contacted for public meeting to discuss re-evaluation
- Letter and hazard report template under staff review

Questions on Seismic Reevaluation?

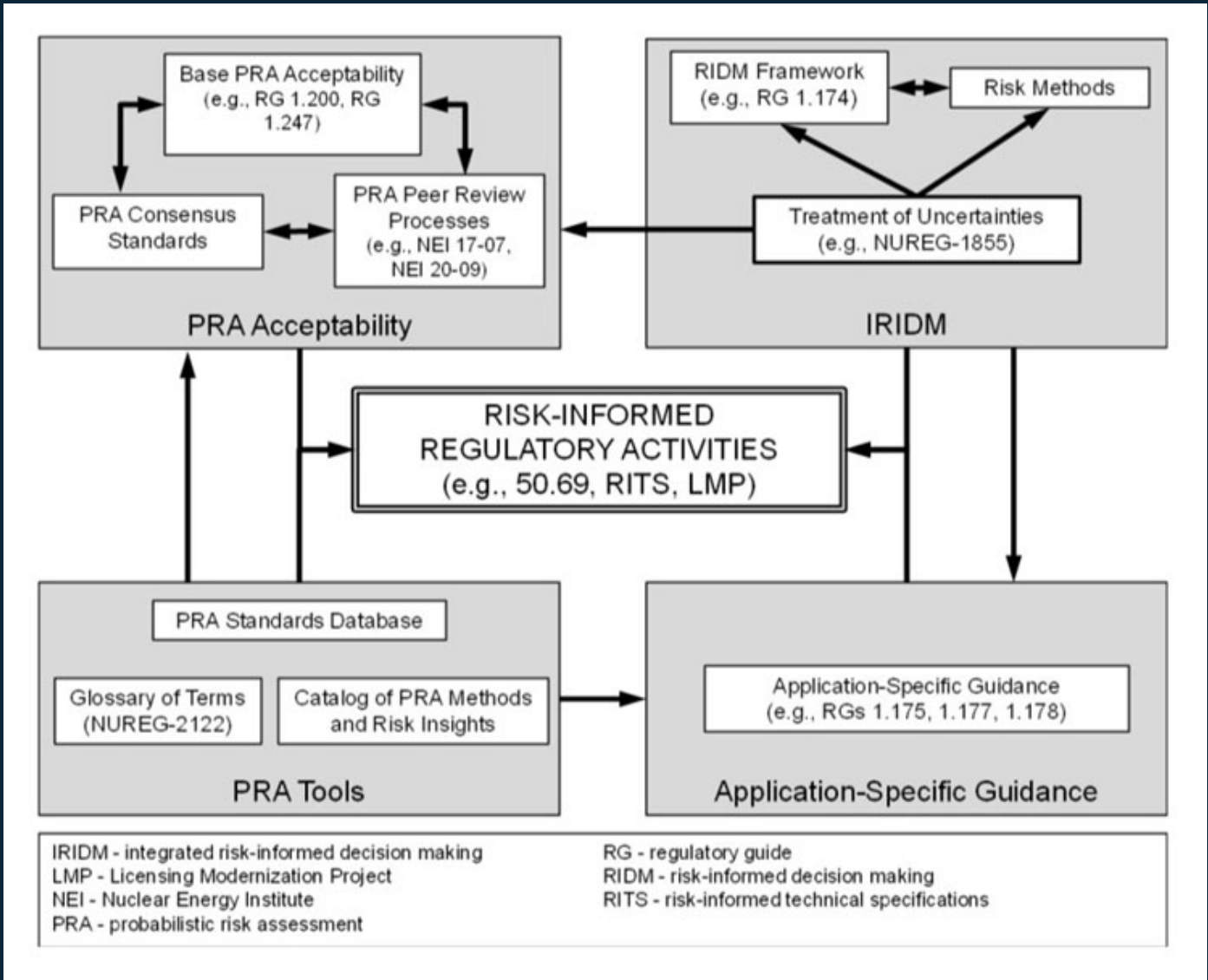
RIDM/PRA Guidance and Infrastructure Updates



Development and Enhancement of Guidance

- Use of risk results and insights
- Methodologies for risk-informed activities
- Associated PRA acceptability to address the needs of LWRs, ALWRs, NLWRs
  - Greater technical consistency across all reactor technologies
  - Improved resources to review submittals effectively and efficiently

Interconnection of Guidance Activities

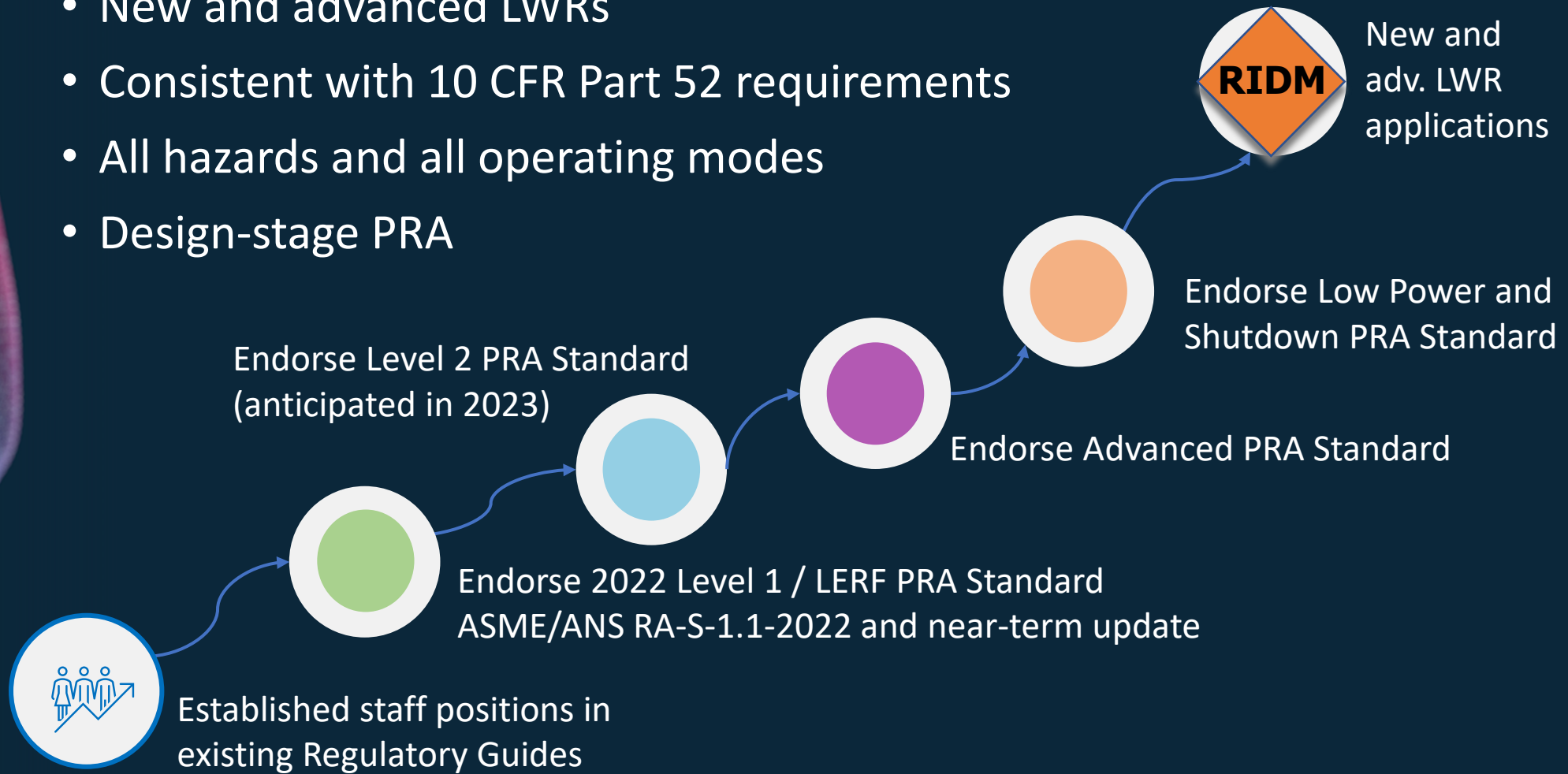


Overview of Guidance Activities

- Ongoing activities
  - Updating guidance in RG 1.200
  - Developing a database for PRA Standards requirements and staff endorsements
  - Developing a catalog of PRA methods
  - Updating guidance on treatment of uncertainties
  - Updating Glossary of Risk Terms
- Potential future activities
  - RG 1.174 update
  - Scoping study to determine needs to update RIDM LWR guidance
  - Development of RIDM guidance for NLWRs

Next Revisions to Regulatory Guide 1.200

- Endorsement of PRA standards to support:
- New and advanced LWRs
- Consistent with 10 CFR Part 52 requirements
- All hazards and all operating modes
- Design-stage PRA



PRA Standards Database

- Improve efficiency and workflow for NRC's activities involving PRA Standards.
  - Reviewing PRA Standards for endorsement in NRC Reg. Guides
  - Reviewing risk-informed license amendments
- The PRA Standards Database can:
  - Track document changes
  - Compare across documents
  - Highlight areas for focused review
  - Track comments and collaboration between review team members
- Publicly available database version is under development (limited to publicly available documents)

- Guidance on Treatment of Uncertainties
  - Update NUREG-1855 to reflect new consensus PRA standards and emerging needs from operating and advanced light water reactors
  - Update/develop specific guidance to treat uncertainty in different risk applications
- Catalog of PRA Methods
  - A KM tool to help with more rapidly indicating the depth of review needed for a method used in a given risk-informed activity
  - Database will include methods for all hazards that have been approved, accepted, or widely implemented in PRAs for U.S. NPPs. Additionally, this database is used to catalog information about NDMs.
- Glossary of Risk-Related Terms
  - Update NUREG-2122 to include updated and new definitions of terms broadly used by PRA practitioners and risk-informed decision makers
  - Update will include a focused effort to identify consensus definitions for terms related to new and advanced LWR and NLWR risks

Questions on RIDM/PRA Guidance?